100 Mile House
Forest District

Timber Emphasis
VRI Ground Sampling
Project Implementation Plan

PREPARED BY:
MINISTRY OF FORESTS
RESOURCES INVENTORY BRANCH

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EXECUTIVE SUMMARY

This is a Vegetation Resource Inventory (VRI) Project Implementation Plan (VPIP) for the VRI timber emphasis sampling planned in the 100 Mile House Forest District in the 2001 field season. The target population is the Vegetated Treed (VT) portion of the TSA in the District, excluding private and federal lands. Parks and other legally recognized Protected Areas and woodlots are included in the landbase. Sample polygons will be selected over the entire target population using stratified probability proportional to size with replacement (PPSWR) sampling, with the strata based on forest type (leading-species groups) and total polygon volume. The inventory is currently planned for implementation in one phase. The plan calls for the establishment of 100 samples to achieve a desired sampling error of 10% at the 95% level of probability. Due to funding limitations seventy-five VRI samples will be establishe.' in the 2001 field season in the VT landbase outside of the Lignum Innovative Forest Practices Agreement (IFPA) area. Analysis in the fall will review the precision (sampling error) of the first field samples and recommend if additional samples are required.. The results will be reviewed with the project sponsor Chasm Sawmills, A Division of West Fraser Mills Ltd.. Follow up Net Volume Adjustment Sampling (NVAF) will also be reviewed.. The estimated budget is $150,000 for the 2001/2002 FRBC Standard Agreement supporting this project.

Table of Contents

EXECUTIVE SUMMARY I

1. INTRODUCTION 1

1.1 BACKGROUND 1

1.2 RATIONALE 1

2. SAMPLING PLAN 2

2.1 OVERVIEW 2

2.2 LANDBASE 2

2.3 INVENTORY OBJECTIVES 4

2.4 TARGET POPULATION 5

2.5 SAMPLE SIZE 4

2.6 SAMPLE SELECTION 65

2.7 MEASUREMENTS 6

2.8 NET VOLUME ADJUSTMENT FACTOR SAMPLING 7

2.9 WITHIN POLYGON VARIATION SAMPLING 8

3. IMPLEMENTATION PLAN 8

3.1 OVERVIEW 8

3.2 SCHEDULE 8

3.3 SAMPLE PACKAGES 9

3.4 PROJECT SUPPORT 9

3.5 FIELDWORK 9

3.6 QUALITY ASSURANCE 9

3.7 DATA COMPILATION, ANALYSIS, AND ADJUSTMENT 9

3.8 ROLES AND RESPONSIBILITIES 9

3.9 APPROXIMATE COSTS 10

3.10 MONITORING 11

4. APPENDIX A – GLOSSARY OF TERMS 11

5. APPENDIX B 16

6. APPENDIX C 20

7. APPENDIX D 21

8. APPENDIX E 22

9. APPENDIX F 24

List of Tables

Table 1. 100 MH TSA landbase 3

Table 2. Sample cluster distributin in the VT landbase 5

List of Figures

Figure 1. Decreasing sampling error with increasing sample size.....5

1. INTRODUCTION

1.1 Background

This VRI Project Implementation Plan (VPIP) outlines ground sampling activities for Timber Emphasis VRI ground sampling in the 100 Mile House Forest District. This plan was developed by the Cariboo Forest Region (CFR) of the Ministry of Forests (MOF). Specifically, Nona Phillips, the Vegetation Resources Inventory Forester, Gregor Lee, Re-Inventory Forester and Eric Johansen, Regional Timber Supply Planner for 100 Mile House TSA, contributed from the Region. Utilizing the experience of other multi-year projects in this Region (Williams Lake TSA, Lignum IFPA), this group consulted with Resources Inventory Branch (RIB) staff in Victoria in the development of the approach and subsequently the sampling lists. Key to this work were Resources Inventory Branch employees Sam Otukol, Statistician, Keith Tudor, VRI Coordinator and Gary Johansen, Sampling Plan/List development. The primary fiscal contributor at the initiation of this project, Chasm Sawmills, A Division of West Fraser Mill Ltd. was consulted prior to sign off of this document.

This VPIP is based on the 100 Miles House Forest District VRI Strategic Inventory Plan (VSIP), finalized and signed off in the spring of 1999.

1.2 Rationale

The Re-inventory process in general, and specifically, the initiation of VRI sampling is motivated by the conclusion of the Draft Inventory Audit – Extended Analysis. This report recommended some form of adjustment to average per hectare volumes within identified affected strata during the current timber supply review process. Please note that audit data (base 50 samples) is not used to adjust inventory related files, but the impacts are considered as sensitivity analysis by the ChiefForester. This VRI work should be available for the next 'round' of Timber Supply Review (TSR 3).

An Inventory Audit was conducted in the 100 Mile House Forest District in 1995 to check the accuracy of the mature timber volume. There was no statistically significant difference between the overall mean audit volume (220 cubic metres/ha) and the map label volume (247 cubic metres/ha). However, for the operable land base, the difference between the mean audit volume (225 cubic m/ha) and the map label volume (261 cubic m/ha) was significant. As a follow-up to the 100 Mile House TSA Inventory Audit Report which recorded this finding, this Extended Analysis further examined three aspects of the per hectare volume bias

(overestimate), using the Audit data. From this Analysis (see APPENDIX E), the following points have been taken from its Executive summary:

The reported TSA wide bias (overestimate) in per hectare volume of 11% represents dilution of much larger overestimates, confined to the Big Bar PSYU and IDF BEC Zones.

UNIT	NAME	BIAS%	SIGNIF
TSA	OMH	**11**	No
PSYU	Big Bar	**27**	**Yes**
BEC	IDF	**30**	**Yes**

NOTE: "Signif" means statistical significance.
BIAS% = (Aud.- Inv./Inv.)

The preference for above average stems and per hectare volumes, exhibited by harvesting operations, is apparently responsible for much of the bias within the identified strata.

The inventory database no longer reflects the current profile of forest stands within these sub-units. This implies that the sample base underlying VDYP must be updated to accurately reflect existing conditions.

In conclusion, the audit ratios point to a risk in the current inventory and the VRI will verify the initial trends and will eventually be used to adjust the inventory.

Also, note the inventory program will not be localizing the VDYP yield model. Localization will occur using VRI ground sample plots.

2. SAMPLING PLAN

2.1 Overview

The information in this section includes a description of the landbase, inventory objectives, target population, sample size and selection, and the VRI tools to be used.

2.2 Landbase

The planned inventory unit for the 100 Mile House Vegetation Resources Inventory is the entire TSA, which coincides with the 100 Mile House Forest District.

The 100 Mile House TSA is located in the Cariboo Forest Region in south central British Columbia, between the Fraser River and the Quesnel Highlands. The total area of the TSA is 1.22 million hectares. From the 1993 Timber Supply Review (TSR I) report, the total forested land = 938,421 while the Timber Harvesting Land Base = 744,099 ha. These numbers suggest that about 21% of forested land is not in the THLB and the THLB is only 61% of the total area of the TSA.
Given the difficulty in simply defining the Timber Harvesting Land Base (THLB) in the database, difficulties in adjusting a changing (THLB) population, issues around lack of complete coverage of the forested land base and the "relatively" low proportion of non THLB (compared to some units in BC), the entire Vegetated Treed landbase is represented in the Sampling Lists. This will better support the overall VRI objective of being able to adjust the volume/ha for the 100 Mile House TSA. This new inventory will cover the TSA landbase, including parks and woodlots. Private land and federal land will be excluded from the sampling process.

Leading species in the 100 Mile House TSA are mainly lodgepole pine, Douglas Fir, and spruce with a minor component of balsam, cedar and hemlock. Half of the TSA falls into the IDF biogeoclimatic zone , followed by the SBPS (19%) and SBS (14%). The remainder of the TSA is composed of minor components of ESSF (8%), ICH(6%), MS (2%), BG (1%) and AT (1%). (These figures are taken from the VRI Strategic Inventory Plan for 100 Mile House TSA, authored by J.S. Thrower & Associates.)

Table 1 reflects the 100 Mile House TSA vegetated treed landbase by species. This information was used in the development of the sampling list.

Table 1. 100 MH VT landbase by species

Leading Species	Area (ha)	%
Ac	322.560	
At	49,562.720	
E	2,487.280	
Ep	209.400	
Sub-total	52,581.960	5.8
B	15,168.920	
Bl	1,555.520	
S	84,831.320	
Sb	51.680	
Se	543.720	
Sw	133.120	
Cw	3,108.880	
Hw	22.640	
Sub-total	105,415.800	11.6
Fd	276,715.720	30.4
Pa	418.440	
Pl	470,260.680	
Py	4,707.080	
Sub-total	475,386.200	52.2
Total	*910,099.68*	*100*

March 29, 2001 generated from sample selection files

2.3 Inventory Objectives

The objective of this project is to establish an overall unbiased average volume per hectare for the TSA.

The main objective of the VRI ground sampling timber emphasis inventory is to:

> *Install an adequate number of VRI sample clusters to adjust the vegetated treed (VT) inventory in the 100 Mile Forest District , to achieve a sampling error of ±10% (95% probability) for overall net timber volume in the VT area.*

Net timber volume is gross volume minus stumps, tops, decay, waste, and breakage. Decay and waste are normally estimated using VRI call grading/net factoring and NVAF sampling. In the absence of the NVAF

adjustment, the 1976 MOF Forest Inventory Zone Decay, Waste and Breakage factors will be used to net down gross merchantable volume.

It is recognized that without NVAF sampling the overall net merchantable volumes derived from the VRI ground sampling phase may not be correct.

2.4 Target Population

The target population is the Vegetated Treed (VT) portion of the TSA, excluding private and federal lands. Parks and other officially protected areas, and woodlots are included in the sampling population. The sample lists provided by RIB will include the samples in the Lignum IFPA. For the 100 Mile sample plan any samples falling within the Lignum IFPA area will be excluded from sampling, and the samples that were completed in a Lignum project in 1997 and 1998, will be weighted in the analysis process.. We can combine/pool etc the samples at the analysis/adjustment stage. This sample plan provides that flexibility.

2.5 Sample Size

To meet the inventory objectives (section 2.3), an initial sample size of 100 VRI sample clusters was recommended. The sample size was derived from the desire to achieve an overall sampling error of 10% at the 95% level of probability. The coefficient of variation (46%) derived from the inventory audit was used to determine the initial sample size. After the first season of sampling, the sampling error for this project will be calculated by RIB, and a more accurate requirement of sample numbers will be assessed, based on the Inventory Objectives (Figure 1).

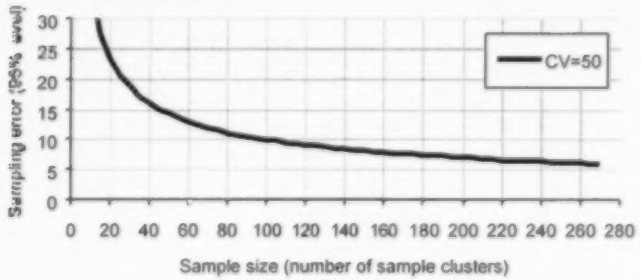

Figure 1. Decreasing sampling error with increasing sample size.[1]

[1]The CV, or coefficient of variation, is estimated from the inventory audit data.

2.6 Sample Selection

The Resources Inventory Branch has selected sample polygons using the new stratified probability proportional to size with replacement (PPSWR) sample selection. The samples were selected by Gary Johansen using the most current FIP files. Stratification was based on leading species and polygon volume per hectare. Samples were drawn from the entire Vegetated Treed polygons in the District, including the Lignum Chart area (or IFPA). The VT land base was derived from the FIP attributes using MoF BCLS conversion software. Sample allocation to individual leading-species strata and substrata will be proportional to strata or sub-strata areas (Table 2). PPSWR will be applied to each sub-stratum.

Table 2. Sample cluster distribution in the VT landbase.

Landbase	Area (%)	Number of clusters
Pl strata	52	52
F	30	30
B,S,H, Cw	12	12
At,Ac,E	6	6
Total	*100*	*100*

300 samples have been drawn (in GROUPS of 50), and 100 samples will be identified as a sub-sample of the 300 (they are a representative sample of the 300). The first 100 samples will be divided into GROUPS of 50 samples, each GROUP representing the population. (See APPENDIX B.) Their orders within the GROUPS will be randomized. To use these lists, beginning with GROUP A samples, the field crews should start at the top of the list and work their way down, only skipping over samples that do not meet the sampling population criteria. A permanent record will be made explaining any 'skipped' samples i.e. ownership = private land, jointly by the Region and Project Manager.
As far as the Lignum area goes, it will be critical to provide a digital version of the boundary that is being used to define the population. Julie Negraeff, GIS, in the Cariboo Region has provided RIB (Gary Johansen) with a copy of this in June of 2001.

Additional GROUPS of 50 samples, up to 300, are being kept at Resources Inventory Branch in case there is a need to increase sample size or replace the samples. To obtain additional samples, the Region is required to write to Resources Inventory Branch stating the number of samples required and the reasons why the additional samples are required. RIB can also provide CD's with mapsheets showing the polygon selected for sampling.

Several comments regarding this section of the plan.

- Gary has prepared a sample to population summary for each of the 6 scoops of 50 samples. They were approved by RIB.
- The population used to make the comparison is the entire TSA, including the Lignum area. From discussions with Gary he decided he would be unable to obtain an accurate population summary using the Lignum, spatial fles. Region will examine actual plot locations to determine correct ownership. RIB's recommendation is to use the entire TSA as the true population summary and live with any noise caused by including the Lignum area in the population comparsion summary..

- The Region has removed any Lignum samples etc from the sample lists and preparing a 100 polygon 100 Mile only sample list. The final 100 sample population list and comparison are presented in this report.

2.7 Measurements

The ground sampling involves collecting the tree attribute data on a representative sample of stands using the Vegetation Resource Inventory (VRI) procedures. VRI certified crews will gather data following the current VRI *Ground Sampling Manual*. The measurements will be recorded using the VRI Card Types 1-3, and 8-11. The Succession Interpretation card (EO card, Card 16) will also be completed for each sample. According to the procedures for VRI, GPS co-ordinates will be collected at the Tiepoint, as well as for each integrated plot center, according to the Procedures referenced in the Standards Agreement.

2.8 Net Volume Adjustment Factor Sampling

This sampling is optional, and will not be completed during the first year of this project, however the proponents recognize that without NVAF sampling the inventory is incomplete and uncertainty over net volumes will still exist. RIB recommends a minimum NVAF sample size of 50 live and 10 trees distributed proportionally by species throughout the sample population. Experience has suggested this level of sampling will provide a 10% sampling error at the 95% level of probability of the estimated to actual NVAF ratio for all species. If after collecting this minimum information proponents decide additional strata level sampling is desired, additional NVAF sampling should be considered. Preliminary review of the NVAF data for the Lignum portion of the 100 Mile TSA suggest that the existing loss factors and taper models over predict volume by 6.5%. It should be noted that these figures are based on a small data set, but are presented to highlight the potential risks associated with using the existing loss factor and taper systems. During the field season, the MOF and representatives of Chasm Sawmills will investigate subsequent year's NVAF work, sampling by strata. For example, following the example of Lloyd Wilson, VRI Forester in Kamloops, we might consider studying 30 trees in 4 different strata (Cw-Hw, Fd, Pl, and S-B).

Appendix F provides additional NVAF summary information.

2.9 Within Polygon Variation Sampling

No WPV sampling is planned at this time. WPV sampling provides information to estimate individual polygon error, assessed as the difference between adjusted polygon value and "true" value for that polygon based on intensive sampling of sample polygons.

3. IMPLEMENTATION PLAN

3.1 Overview

There is currently one year of sampling planned in the 100 Mile House TSA. At the end of the first year the samples will have been established in such a manner as to provide an overall unbiased estimate. If data from Year I suggests, the Ministry of Forests Regional staff will undertake discussions with the Stakeholders to encourage future years' continuation of the project.

3.2 Schedule

The VRI will be implemented in 2001 as follows:

1. Select the sample polygons (May)(Resources Inventory Branch).
2. Prepare and submit a VPIP (this Plan) for approval by the Stakeholders (June)(Cariboo Forest Region -CFR).
3. Tender and select contract crews, and award contracts (June)(Licensee-Chasm Sawmills).
4. Prepare sample packages. Each will included items as outlined in the Standards Agreement, Schedule A (Appendix D) (July)(Licensee's Contractor).
5. Locate and measure the sample clusters (August-October) (Licensee's Contractor).
6. Conduct quality assurance (10% check) (August-October) (Licensee's QC contractor and CFR).
7. Validate and compile data from completed sample clusters and prepare inventory summary reports (November) (Resources Inventory Branch).
8. Conduct statistical analysis, evaluate CV (timing and RIB commitment to be discussed. At the time of the writing of this plan, RIB could not commit to the analysis. It was suggested that the licensee might be required to pay for contract analysis.

3.3 Sample Packages

Field sample packages should include a copy of the most current photo stereo-pairs for access, a copy of the document photos (where possible), sample cluster location maps (1:20,000), and access maps clearly indicating sample cluster location and polygon boundaries (1:50,000) for general polygon location. The 1:350,000 Roads Map for the Cariboo Region will also have the samples plotted, to assist both the crews and project manager. Maps will be plotted by the Contractor showing the VRI grid overlays and the Ministry Representative will select sample locations. For the contracted details of the sample packages, reference should be made to Schedule A from the Standards Agreement, attached to this document in Appendix D.

3.4 Project Support

The details of support, by both the MOF and the Recipient (Licensee) are outlined in the Schedule A of the Standards Agreement, in APPENDIX D.

3.5 Fieldwork

Fieldwork will be completed using VRI measurement protocols and VRI Timber-certified crews. The VRI Card Types 1-3 and 8-11 and 16 will be completed according the VRI Ground Sampling Procedures Manual, Version 4.2. MOF Region staff will work with Chasm Sawmills personnel or their contracted representatives to manage the fieldwork contracts and ensure data quality.

3.6 Quality Assurance

Quality assurance must be conducted, according to the Procedures and Standards of the VRI. The VRI Quality Assurance Standards require inspection of at least 10% of the samples. The requirements of this contract are again detailed in the Standards Agreement and its Attachments.

3.7 Data Compilation, Analysis, and Adjustment

Contract field crews will do the data entry and submit it directly to RIB. The Resources Inventory Branch will complete data compilation. The Resources Inventory Branch will also complete the statistical analysis and database adjustment. Please see the previous notes regarding analysis. If the adjustment database is developed and operational .. RIB will undertake the adjustments to the database.

3.8 Roles and Responsibilities

Included in this list are the tasks and the organization who is responsible for each undertaking:

- Select the sample polygons (Resources Inventory Branch).
- Select sample locations within polygons (Cariboo Forest Region).
- Support the Quality Assurance process (Licensee and Cariboo Forest Region)
- Check data after initial compilation (Resources Inventory Branch). Please note: RIB cannot commit to data running/ analysis at this time.
- Validate and compile data. Calculate the CV for this project based on Year 1 data and Lignum data combined (Resources Inventory Branch). RIB can compile the data.
- Provide attribute files and minimum standards for statistical analysis (Resources Inventory Branch).
- Prepare and sign-off Standards Agreement and Schedule A - Agreement between Chasm Sawmills, A Division of West Fraser Mills Ltd. and and the MOF Cariboo Forest Region (Cariboo Forest Region).
- Award fieldwork contracts (Licensee)
- Provide mentoring for field crews at the start of fieldwork. (Cariboo Forest Region and RIB).
- Coordinate project activities, and ensure all contractors are qualified and certified. Tender and manage fieldwork contracts (Joint Licensee and Cariboo Forest Region).
- Assess access and coordinate the use of helicopters (Licensee/Contractor/Cariboo Forest Region).
- Identify access routes and potential tie points (Contractor with Cariboo Forest Region support).
- Ensure sample packages are assembled and complete (Cariboo Forest Region)
- Ensure quality assurance (QA) is complete (Cariboo Forest Region).

Field work contractors

- Prepare all sample packages
- Complete field sampling.
- Conduct internal quality control.
- Enter the sample data and submit to RIB.
- Prepare final package submission with complete contents as per Schedule A of the Standards Agreement (see APPENDIX C).

Check-cruiser responsibility (Licensee contractor in co-operation with the Cariboo Forest Region)

- Complete QA work for 10% of the VRI samples
- Enter QA sample data and submit to RIB.
- Prepare the QA reports and paperwork according to the Quality Assurance Standards for VRI and the Schedule A.

3.9 Approximate Costs

Costs can be broken down into the following items:

- Field sampling – Crews will be doing package preparation, field work, data input and final deliverables submission for up to 75 "VRI Timber Emphasis with Succession Interpretation" samples.

- Helicopter access for these samples. (This to be determined between the Ministry of Forests project manager and the crews prior to the start of work, following package preparation.)
- QA on approximately 10 samples by a Qualified VRI contractor

The available FRBC funds are $150,000. Efforts will be made to determine whether there will be either an excess or deficit of funds early in the project so that changes can be made in the sampling and the lists are properly followed. The critical factors are the bid price per sample and the amount of helicopter time required.

3.10 Monitoring

The RIB is responsible for monitoring this VPIP and its approval.

4. Appendix A – Glossary of Terms

District-wide VRI

This is synonymous with provincial VRI; see Provincial VRI.

Ground Sampling

Ground sampling is the field measurement of timber, ecology, range, and/or coarse woody debris values at one or more locations within each sample polygon. Sample polygons are selected proportional to their area from a sorted list. To accommodate a wide variety of resources, various types and sizes of sampling units (e.g., fixed and variable plots, transects) are used to make the measurements.

Inventory Unit

An inventory unit is the target population from which the samples are chosen. For the provincial VRI, the inventory unit is the Forest District, which includes the timber harvesting landbase, parks, recreational areas, private, and federal lands. For management inventories, the inventory unit is a subset of the provincial VRI inventory unit that focuses on a geographic area or specific attribute set, depending upon sampling objectives.

Landcover Classification

The BC Land Cover Classification Scheme (BCLCS) was designed specifically to meet VRI requirements, in addition to providing general information useful for "global vegetation accounting" and "integrated resource management." The BCLCS is hierarchical and reflects the current state of the landcover (e.g., presence or absence of vegetation, type and density of vegetation) and such fixed characteristics as landscape position (i.e., wetland, upland, alpine). There are two main classes of polygons: Vegetated and Non-Vegetated.

Management VRI

Management VRI are specialized inventories that provide detailed information required for specific resource management, i.e., day-to-day forest management. One or more VRI sampling procedures may be used for management inventories. Management inventories may focus on specific resource types (e.g., timber, range, ecology), geographic areas (e.g., landscape unit, TFL), attribute sets (e.g., Douglas-fir leading stands, age class 4+). They may use one or more of the following tools (e.g., photo-interpretation, ground sampling, NVAF sampling).

National Forest Inventory (NFI)

The NFI provides information on Canada's resources across all provinces and allows the Federal Government a consistent framework for reporting on Canada's inventory. The inventory unit for the NFI is the entire country, although it is implemented province-by-province.

Net Volume Adjustment Factor (NVAF) Sampling

NVAF sampling provides factors to adjust net tree volume estimated from net factoring and taper equations. The adjustment accounts for hidden decay and possible taper equation bias. NVAF sampling involves detailed stem analysis of sample trees, calculation of actual net volume, and calculation of the ratio between actual net volume and estimated net volume (where estimated net volume is obtained from net factoring and taper equations).

Photo-Interpretation

Photo-interpretation involves subjective delineation of polygons and photo estimation of attributes for all polygons in an inventory unit. Medium scale aerial photographs (1:15,000) are most often used in photo-interpretation. However, if existing photo-based inventory is acceptable, the database can be translated into VRI format and upgraded to include the additional VRI attributes.

Post-Stratification

Post-stratification involves dividing inventory unit into mutually exclusive sub-populations (strata) *after* ground sampling has been completed. Samples that fall in each post-stratum are analyzed separately and the results are applied to the corresponding population post-strata to improve the precision of the inventory's overall averages and totals.

Pre-Stratification

Pre-stratification divides an inventory unit into mutually exclusive sub-populations (strata) *before* ground sampling to provide estimates for specific areas, or to increase the confidence in the overall estimates by considering special characteristics of each stratum.

PPSWR (Probability Proportional to Size With Replacement)

This is a sample selection method in which samples (polygons) are selected with probability proportional to their size. That is, the larger polygons have a higher chance of being included in the sample.

Provincial VRI

The provincial VRI provides baseline data for provincial inventory reporting, monitoring, and research. All sampling procedures from the VRI toolbox are used for this inventory at the Forest District level. The databases generated from each District inventory will be compiled to create the provincial VRI database. The provincial VRI has also been referred to in the past as the District VRI.

Resource-Specific Interpretations

Resource-Specific Interpretations (RSI) use the Resource Inventory Committee (RIC) standard VRI baseline data products (provincial VRI or management inventory), in combination with other data sets and analysis (outside of that required to produce VRI), to produce information to address specific-resource management issues (e.g., TSR review, important ecosystems, important habitats). These interpretations include ecosystem interpretations and habitat interpretations.

Retrofit

Retrofitting is the process of translating and upgrading an existing photo-based inventory to VRI standards. If the polygon linework and attributes are of acceptable quality, the existing FIP (Forest Inventory Planning) databases are translated to VIF (Vegetation Inventory Files) databases and the additional attributes required by the VRI are re-estimated from aerial photographs.

Sample Size

The sample size for an inventory is the minimum number of ground samples to be established in an inventory unit to meet the target precision.

Statistical Analysis

Statistical analysis is the process of adjusting the values of the photo-interpretation variables using ground sampling observations. For each sampled polygon, ground observations are compared to photo-estimated values to develop an adjustment factor. This factor is then applied to all polygons in the photo interpretation database to produce the final adjusted database.

Sub-unit

Sub-unit describes the inventory unit of a management inventory (i.e., the management inventory target population is a subset of the provincial VRI inventory unit). A sub-unit may be defined by a specific

geographic area (e.g., operable landbase) or stand type (e.g., problem forest types) within the Forest District.

Target Precision

Target precision expresses the amount of variation in key attributes (e.g., timber volume) desired in the final results. Target precision, usually expressed as the coefficient of variation (CV), is used to calculate the minimum sample size for subsequent ground sampling.

Vegetation Resources Inventory (VRI)

VRI is an improved vegetation inventory process for assessing quantity and quality of BC's vegetation resources. The VRI process is designed to include a flexible set of sampling procedures for collecting vegetation resource information. The VRI is essentially a toolbox of procedures, which include:

- *Photo-interpretation*: the delineation of polygons from aerial photography and the estimation of resource attributes.
- *Ground sampling*: the establishment of plot clusters in selected polygons to measure timber, ecological, and/or range attributes.
- *NVAF Sampling*: stem analysis sampling of individual trees for net volume adjustment.
- *WPV Sampling*: intensive sampling of selected polygons to determine the error between the estimated attribute values and the "true" attribute values.
- *Statistical Adjustment*: the adjustment of the photo-interpreted estimates for all polygons in an inventory unit or management unit using the values measured during ground sampling.

The VRI can be deployed over the entire province (provincial VRI) measuring timber and non-timber resources, or over a large management unit (management VRI) measuring selected resources in specific portions of the landbase. The VRI sampling process produces spatial and non-spatial databases that can be used in multiple resource management applications including timber, ecosystem, and wildlife habitat management.

Within Polygon Variation Sampling

WPV sampling provides information for expressing the true individual polygon error, assessed as the difference between the adjusted polygon value and the "true" value for that polygon. The "true" value for the polygon is an estimate derived from a small sample of polygons that are intensively sampled on the ground.

5. APPENDIX B

LIST OF SAMPLE POLYGONS

List of final 100 Mile samples from the first two sampling lists.

Project ID	GROUP	Sample # - DO NOT CHANGE	NVAF Sample (Minimum)	NVAF Mat/Imm	map_no	polygon	reg_dist	bc_lcs	polyarea	bec	owner	SSPCS1	SSPCS2	HT_PRJ	AGE_PRJ	SITE_IDX	PCT1	PCT2	CRWN_CLS
DMH2	1	101	X	I	092P088	409	36-C	VTUTMOP	20.70	IDF-	62-C	PL	S	17.9	99	12.8	90	10	50
DMH2	1	102	X	M	092O050	93	36-C	VTUTCDE	126.50	IDF-	62-C	FD		26.5	225	12.8	100	0	70
DMH2	1	103		I	092P083	283	36-C	VTUTCDE	18.50	SBPS	62-C	PL		22.1	99	16.4	100	0	70
DMH2	1	104		M	092P031	571	36-C	VTUTCOP	20.90	IDF-	62-C	FD	PL	26.5	225	12.8	90	10	50
DMH2	1	105	X	M	092P003	340	36-C	VTUTCOP	350.50	IDF-	62-C	FD		21.9	225	10.6	100	0	50
DMH2	1	106	X	M	092P072	341	36-C	VTUTMSP	31.30	IDF-	62-C	PL	S	17.6	139	10.2	60	30	40
DMH2	1	107		I	092P095	293	36-C	VTUTMOP	1,160.80	SBS-	62-C	PL	FD	24.7	99	18.7	60	30	60
DMH2	1	108	X	M	092P035	976	36-C	VTUTMOP	67.30	SBPS	62-C	FD	PL	22.1	224	10.7	90	10	30
DMH2	1	109		I	092P041	326	36-C	VTUTMOP	31.60	IDF-	62-C	PL		17.5	115	11.4	100	0	40
DMH2	1	110	X	I	092P026	742	36-C	VTUTCDE	177.90	IDF-	62-C	PL	AT	17.1	75	14.4	90	10	70
DMH2	1	111		M	092O020	236	36-C	VTUTCOP	43.50	IDF-	62-C	FD		21.5	325	9.3	100	0	60
DMH2	1	112		I	092P098	23	36-C	VTUTMOP	86.90	ICH-	62-C	FD	S	27.8	119	17.6	50	30	70
DMH2	1	113	X	M	093A006	389	36-C	VTUTMOP	154.00	ESSF	62-C	S	B	28.5	229	9.6	90	10	40
DMH2	1	114		I	092P035	807	36-C	VTUTMOP	7.70	IDF-	62-C	PL	S	22.1	99	16.4	60	30	50
DMH2	1	115		I	092P051	407	36-C	VTUTMSP	13.40	IDF-	62-C	PL	FD	17.9	99	12.8	60	40	30
DMH2	1	116		I	092P045	624	36-C	VTUTCOP	150.50	IDF-	62-C	PL	AT	17.6	79	14.4	90	10	60
DMH2	1	117		I	092P092	186	36-C	VTUTCSP	77.90	IDF-	62-C	FD	PL	2.1	34	5.0	70	30	10
DMH2	1	118	X	M	093A019	40	36-C	VTUTCOP	76.50	ESSF	62-C	S	B	31.9	230	12.4	60	40	60
DMH2	1	119	X	I	092P033	595	36-C	VTUTMOP	102.90	IDF-	62-C	PL		17.5	95	12.8	100	0	60
DMH2	1	120	X	M	092P014	408	36-C	VTUTCDE	38.40	IDF-	62-C	PL		17.4	135	10.2	100	0	70
DMH2	1	121		I	092P058	367	36-C	VTUTMOP	2.10	SBS-	62-C	AT		24.9	118	17.0	100	0	40
DMH2	1	122	X	I	093A007	178	36-C	VTUTMOP	615.50	ESSF	62-C	S	B	31.2	99	22.5	60	40	50
DMH2	1	123		I	092P057	526	36-C	VTUTMOP	20.20	SBS-	62-C	S	PL	31.2	119	19.7	60	40	60
DMH2	1	124		I	092P028	34	36-C	VTUTCDE	248.90	ZZZZ	62-C	PL	SE	21.5	106	15.3	95	5	70
DMH2	1	125		I	092P037	692	36-C	VTUTCOP	26.50	SBPS	40-N	PL	AT	24.0	115	16.9	90	10	40
DMH2	1	126		I	092P065	88	36-C	VTUTMOP	14.20	IDF-	62-C	PL	AT	22.1	99	16.4	60	30	60
DMH2	1	127	X	I	092P094	51	36-C	VTUTMDE	129.80	SBPS	62-C	PL		24.7	99	18.7	100	0	70
DMH2	1	128		I	092P047	744	36-C	VTUTMOP	133.50	SBPS	40-N	AT	S	17.7	119	11.5	80	10	40
DMH2	1	129		M	092P043	74	36-C	VTUTMOP	20.10	IDF-	62-C	S	PL	20.1	139	9.3	60	30	50

DMH2	1	130	X	I	092P014	782	36-C	VTUTMOP	83.00	IDF-	62-C	FD	PL	13.7	75	11.8	90	10	40
DMH2	1	131	X	M	092P062	264	36-C	VTUTMSP	53.20	IDF-	62-C	FD	PL	26.7	229	12.8	60	40	40
DMH2	1	132		I	092P038	29	36-C	VTUTCDE	684.50	MS--	62-C	PL	S	25.4	106	18.7	90	10	70
DMH2	1	133		I	092P046	605	36-C	VTUTMOP	21.00	SBPS	62-C	PL		22.7	79	19.0	100	0	60
DMH2	1	134		I	092P014	366	36-C	VTUTMSP	485.60	IDF-	62-C	FD	PL	14.4	55	15.6	60	40	30
DMH2	1	135		M	092P043	470	36-C	VTUTMSP	18.00	IDF-	62-C	PL	AT	17.6	139	10.2	80	10	20
DMH2	1	136	X	M	092P044	732	36-C	VTUTMOP	2.30	IDF-	62-C	PL	AT	24.0	139	15.4	60	30	60
DMH2	1	137		I	092P088	187	36-C	VTUTMSP	144.50	ESSF	62-C	BL	S	3.9	32	11.0	85	15	20
DMH2	1	138	X	M	092P001	297	36-C	VTUTCOP	94.80	MS--	63-N	PL	FD	23.7	135	15.4	60	40	70
DMH2	1	139		I	092P024	991	36-C	VTUTMSP	8.00	IDF-	62-C	PL	AT	5.0	28	11.0	99	1	10
DMH2	1	140	X	I	092P057	181	36-C	VTUTMOP	33.00	SBS-	40-N	AT	PL	18.6	59	17.5	80	10	50
DMH2	1	141		I	092P086	593	36-C	VTUTCOP	28.40	SBS-	63-N	FD	PL	18.9	99	13.3	80	10	70
DMH2	1	142	X	M	092O040	372	36-C	VTUTCDE	45.90	IDF-	62-C	FD		26.5	225	12.8	100	0	70
DMH2	1	143		M	092P003	207	36-C	VTUTMOP	17.50	IDF-	62-C	FD		21.9	220	10.7	100	0	40
DMH2	1	144	X	M	092P024	75	36-C	VTUTMSP	136.40	IDF-	62-C	FD	PL	25.0	220	12.2	60	40	30
DMH2	1	145	X	I	093A004	594	36-C	VTUTCDE	176.90	SBS-	62-C	PL	S	24.7	119	17.2	80	20	20
DMH2	1	146		M	092P014	525	36-C	VTUTMOP	125.60	IDF-	62-C	FD	PL	17.8	135	10.6	90	10	40
DMH2	1	147		M	092P002	149	36-C	VTUTMSP	30.00	IDF-	62-C	PL	FD	16.7	225	7.1	60	40	40
DMH2	1	148		I	092P044	197	36-C	VTUTMOP	1.00	IDF-	40-N	PL	AT	6.4	59	6.7	90	10	50
DMH2	1	149		I	093A004	326	36-C	VTUTMOP	110.50	SBS-	62-C	PL	AT	28.9	119	20.9	90	10	50
DMH2	1	150		I	092P003	322	36-C	VTUTMOP	105.50	IDF-	62-C	FD		13.7	75	11.8	100	0	30
DMH2	1	151		I	092P095	257	36-C	VTUTMSP	214.80	ICH-	62-C	PL	AT	29.4	99	22.9	50	30	50

Project ID	GROUP	Sample # - DO NOT CHANGE	NVAF Sample (Minimum)	NVAF Mat/Imm	map_no	polygon	reg_dist	bc_ics	polyarea	bec	owner	SSPCS1	SSPCS2	HT_PRJ	AGE_PRJ	SITE_IDX	PCT1	PCT2	CRWN_CLS
DMH2	2	201			092P062	418	36-C	VTUTMOP	36.10	IDF-	63-N	PL	FD	17.9	99	12.8	80	10	50
DMH2	2	202			092P032	477	36-C	VTUTMSP	153.70	IDF-	62-C	FD	PL	14.4	55	15.6	60	40	30
DMH2	2	203			093A007	276	36-C	VTUTMOP	47.30	ICH-	62-C	S	AT	31.2	99	22.5	60	30	50
DMH2	2	204			093A007	597	36-C	VTUTCOP	92.40	ICH-	62-C	S	FD	31.2	99	22.5	60	30	70
DMH2	2	205			092P004	492	36-C	VTUTCOP	126.40	IDF-	62-C	PL	FD	7.3	75	6.1	90	10	60
DMH2	2	206			092P057	443	36-C	VTUTMOP	32.50	SBS-	62-C	PL	AT	24.3	119	16.9	60	40	50
DMH2	2	207			092P042	170	36-C	VTUTMOP	25.90	IDF-	62-C	PL		17.1	75	14.4	100	0	40
DMH2	2	208			092P096	253	36-C	VTUTMOP	2.60	ICH-	62-C	PL		29.4	99	22.9	100	0	60
DMH2	2	209			093A005	320	36-C	VTUTMOP	122.00	SBS-	62-C	PL		24.7	99	18.7	100	0	40
DMH2	2	210			092P092	311	36-C	VTUTCDE	73.10	IDF-	62-C	PL	FD	22.1	99	16.4	90	10	70
DMH2	2	211			092P088	149	36-C	VTUTCOP	12.50	ESSF	62-C	PL	S	17.6	79	14.4	90	10	60
DMH2	2	212			092P027	1026	36-C	VTUTCOP	18.30	SBPS	62-C	PL	S	7.6	40	11.0	91	6	58
DMH2	2	213			092P054	1065	36-C	VTUTMOP	6.70	IDF-	62-C	PL	S	23.0	229	11.9	60	30	60
DMH2	2	214			092P098	159	36-C	VTUTMOP	31.10	ICH-	62-C	S	FD	31.2	99	22.5	70	10	60

DM-2	2	215			092O049	348	36-C	VTUTMOP	92.90	IDF-	62-C	FD		21.9	225	10.6	100	0	30
DM-2	2	216			092P066	831	36-C	VTUTMOP	12.60	SBPS	62-C	FD	PL	27.8	119	17.6	90	10	40
DM-2	2	217			092P023	307	36-C	VTUTMSP	47.20	IDF-	62-C	FD	PL	14.5	109	9.8	60	30	16
DM-2	2	218			092P031	475	36-C	VTUTCOP	132.80	IDF-	62-C	PL		17.4	135	10.2	100	0	50
DM-2	2	219			092P058	925	36-C	VTUTMOP	39.70	ESSF	62-C	PL	B	24.3	119	16.9	90	10	60
DM-2	2	220			092P061	722	36-C	VTUTMSP	30.90	IDF-	62-C	FD		13.2	44	17.4	100	0	20
DM-2	2	221			092P041	92	36-C	VTUTMOP	427.00	IDF-	62-C	FD		14.4	55	15.6	100	0	30
DM-2	2	222			092P063	587	36-C	VTUTMSP	63.20	IDF-	62-C	FD		6.0	54	7.4	100	0	15
DM-2	2	223			092O050	26	36-C	VTUTCDE	50.90	BG--	62-C	FD		18.2	115	11.8	100	0	70
DM-2	2	224			092P042	333	36-C	VTUTMOP	18.10	IDF-	62-C	PL		7.3	75	6.1	100	0	50
DM-2	2	225			092O020	552	36-C	VTUTMOP	84.30	IDF-	62-C	FD		27.4	155	15.3	100	0	50
DM-2	2	226			092P085	809	36-C	VTUTCOP	110.70	SBS-	63-N	FD	PL	30.1	229	14.6	90	10	60
DM-2	2	227			092P031	112	36-C	VTUTMOP	413.80	IDF-	62-C	FD	PL	25.0	220	12.2	90	10	30
DM-2	2	228			092O040	92	36-C	VTUTCDE	159.80	IDF-	62-C	FD	PL	21.9	225	10.6	90	10	70
DM-2	2	229			092P061	165	36-C	VTUTMOP	108.20	IDF-	62-C	PL		23.0	229	11.9	100	0	30
DM-2	2	230			093A008	64	36-C	VTUTMOP	54.80	ICH-	62-C	S	PL	26.6	99	18.4	80	10	40
DM-2	2	231			092P068	42	36-C	VTUTMSP	28.40	ESSF	62-C	PL	AT	28.8	118	20.9	40	30	40
DM-2	2	232			092P092	335	36-C	VTUTMSP	28.80	IDF-	62-C	FD	PL	12.4	59	12.8	60	40	20
DM-2	2	233			093A008	244	36-C	VTUTMSP	198.00	ESSF	62-C	B	S	19.1	229	7.5	60	40	30
DM-2	2	234			092P011	482	36-C	VTUTMOP	102.70	MS--	62-C	PL	FD	17.5	115	11.4	60	40	50
DM-2	2	235			092P025	568	36-C	VTUTMOP	7.80	IDF-	62-C	PL		17.5	115	11.4	100	0	40
DM-2	2	236			092P028	468	36-C	VTUTCDE	156.90	ZZZZ	62-C	PL		23.3	115	16.2	100	0	80
DM-2	2	237			092P044	386	36-C	VTUTMDE	15.90	IDF-	62-C	AT	PL	17.5	99	12.4	90	10	70
DM-2	2	238			092P036	522	36-C	VTUTCDE	26.90	SBPS	62-C	PL		22.1	99	16.4	100	0	80
DM-2	2	239			092P014	739	36-C	VTUTMSP	46.80	IDF-	62-C	PL	FD	6.9	25	16.0	89	11	20
DM-2	2	240			093A008	310	36-C	VTUTMOP	127.40	ESSF	62-C	S	AT	19.1	99	12.5	80	10	40
DM-2	2	241			092P026	1145	36-C	VTUTCSP	81.60	SBPS	62-C	PL	AT	17.1	75	14.4	50	30	50
DM-2	2	242			092P012	659	36-C	VTUTMOP	104.10	IDF-	62-C	PL	FD	17.4	135	10.2	90	10	40
DM-2	2	243			092P041	395	36-C	VTUTMOP	42.70	IDF-	62-C	PL		19.3	55	19.9	100	0	40
DM-2	2	244			092P025	362	36-C	VTUTMOP	70.00	IDF-	62-C	PL	FD	23.7	135	15.4	90	10	60
DM-2	2	245			092P098	240	36-C	VTUTMOP	18.70	ICH-	62-C	PL	S	23.9	84	19.5	80	15	50
DM-2	2	246			092P082	468	36-C	VTUTCOP	146.00	IDF-	62-C	FD	PL	22.0	229	10.6	60	40	50
DM-2	2	247			092P087	104	36-C	VTUTCOP	9.20	SBS-	62-C	FD	PL	18.9	99	13.3	60	40	50
DM-2	2	248			092P097	400	36-C	VTUTMOP	85.80	ICH-	62-C	AT	FD	27.7	99	20.5	80	10	60
DM-2	2	249			092P024	231	36-C	VTUTMOP	14.50	IDF-	62-C	PL		17.1	75	14.4	100	0	60
DM-2	2	250			092P052	141	36-C	VTUTMOP	21.40	IDF-	62-C	AT	S	17.5	79	13.9	60	40	50
DM-2	2	251			092P021	629	36-C	VTUTMOP	89.70	IDF-	62-C	FD	PL	18.4	95	13.3	90	10	60
Project ID	GROUP	Sample # - DO NOT CHANGE	NVAF Sample (Minimum	NVAF Mat/lmm	map_no	polygon	reg_dist	bc_ics	polyarea	bec	owner	SSPCS1	SSPCS2	HT_PRJ	AGE_PRJ	SITE_IDX	PCT1	PCT2	CRWN_CLS

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DM-2	3	**301**			092P022	399	36-C	VTUTMSP	16.70	IDF-	62-C	FD	PL	16.9	225	8.2	60	40	40
DM-2	3	**302**			092P035	139	36-C	VTUTCOP	28.30	IDF-	62-C	FD		26.5	225	12.8	100	0	60
DM-2	3	**303**			092P026	664	36-C	VTUTCDE	6.00	SBPS	62-C	PL		7.3	75	6.1	100	0	70
DM-2	3	**304**			092P051	390	36-C	VTUTCDE	32.00	IDF-	62-C	PL		22.1	99	16.4	100	0	70
DM-2	3	**305**			092P096	289	36-C	VTUTMOP	28.40	ICH-	62-C	S	AT	19.1	99	12.5	80	10	50
DM-2	3	**306**			092P021	533	36-C	VTUTMSP	36.40	IDF-	62-C	PL	FD	17.5	115	11.4	60	40	40
DM-2	3	**307**			092P006	1168	36-C	VTUTCOP	150.00	IDF-	62-C	PL	S	23.7	135	15.4	90	10	50
DM-2	3	**308**			092P096	625	36-C	VTUTMOP	154.10	ESSF	62-C	B	S	24.2	229	9.6	60	40	60
DM-2	3	**309**			092P036	514	36-C	VTUTCOP	67.90	SBPS	62-C	PL	S	24.3	119	16.9	60	40	60
DM-2	3	**310**			092P025	608	36-C	VTUTMOP	197.50	IDF-	62-C	PL		17.5	95	12.8	100	0	50
DM-2	3	**311**			092P063	492	36-C	VTUTMOP	29.60	IDF-	62-C	PL	AT	22.1	99	16.4	50	30	60
DM-2	3	**312**			092P088	105	36-C	VTUTCOP	41.00	SBS-	62-C	PL	AT	24.7	99	18.7	90	10	60
DM-2	3	**313**			092P095	283	36-C	VTUTMOP	5.60	SBS-	62-C	PL	FD	24.7	99	18.7	60	30	60
DM-2	3	**314**			092P024	566	36-C	VTUTMOP	7.90	IDF-	62-C	AT	PL	12.1	28	20.0	80	20	40
DM-2	3	**315**			092P021	933	36-C	VTUTMSP	5.90	IDF-	62-C	PL	FD	5.1	20	16.0	70	20	30
DM-2	3	**316**			092P024	1118	36-C	VTUTMOP	121.20	IDF-	62-C	FD	PL	26.5	225	12.8	60	40	50
DM-2	3	**317**			092P025	1160	36-C	VTUTMSP	13.40	IDF-	62-C	FD	PL	16.9	82	13.5	90	10	23
DM-2	3	**318**			092P002	899	36-C	VTUTCDE	19.50	ESSF	63-N	PL	S	17.5	115	11.4	90	10	70
DM-2	3	**319**			092P095	99	36-C	VTUTMOP	648.90	SBS-	62-C	PL	AT	22.1	99	16.4	60	40	60
DM-2	3	**320**			092P014	45	36-C	VTUTMSP	163.00	IDF-	62-C	FD	PL	18.1	75	15.3	60	40	30
DM-2	3	**321**			092P022	2	36-C	VTUTMSP	94.80	MS--	62-C	PL		17.1	115	11.0	100	0	20
DM-2	3	**322**			093A008	120	36-C	VTUTMOP	89.60	ESSF	62-C	S	PL	26.6	99	18.4	80	10	50
DM-2	3	**323**			092P095	153	36-C	VTUTMOP	58.70	SBS-	62-C	S	B	31.9	229	12.4	60	40	60
DM-2	3	**324**			092P025	121	36-C	VTUTMSP	1,079.30	IDF-	62-C	FD	PL	18.1	75	15.3	60	40	30
DM-2	3	**325**			092P018	38	36-C	VTUTMOP	37.70	MS--	69-N	PL		16.1	74	13.7	100	0	50
DM-2	3	**326**			092P036	427	36-C	VTUTMDE	25.60	SBPS	40-N	AT	PL	26.8	115	18.7	90	10	70
DM-2	3	**327**			092P003	391	36-C	VTUTMOP	15.10	IDF-	62-C	FD		21.9	220	10.7	100	0	30
DM-2	3	**328**			093A007	377	36-C	VTUTCOP	33.00	ESSF	62-C	S	B	26.6	99	18.4	80	10	70
DM-2	3	**329**			092P076	434	36-C	VTUTMOP	24.50	ESSF	62-C	PL	S	17.9	99	12.8	90	10	50
DM-2	3	**330**			092P037	154	36-C	VTUTCOP	75.40	SBPS	62-C	PL	S	23.7	135	15.4	90	10	60
DM-2	3	**331**			092P073	561	36-C	VTUTMSP	44.50	IDF-	62-C	FD	PL	24.9	79	20.0	60	40	40
DM-2	3	**332**			092P071	478	36-C	VTUTMOP	1.20	IDF-	62-C	PL		17.8	119	11.4	100	0	60
DM-2	3	**333**			092P037	707	36-C	VTUTCOP	30.10	SBPS	62-C	PL	AT	24.0	139	15.4	90	10	60
DM-2	3	**334**			092P083	163	36-C	VTUTCOP	32.50	IDF-	40-N	FD		27.8	119	17.6	100	0	50
DM-2	3	**335**			092P085	170	36-C	VTUTMSP	11.40	SBS-	62-C	FD	PL	22.1	224	10.7	60	40	40
DM-2	3	**336**			092O040	339	36-C	VTUTCDE	138.10	IDF-	62-C	FD		21.9	225	10.6	100	0	70
DM-2	3	**337**			092P057	507	36-C	VTUTMOP	30.60	SBS-	62-C	PL	AT	29.4	99	22.9	60	30	50

DM-2	3	**338**			092P004	328	36-C	VTUTCOP	28.40	MS--	62-C	FD	PL	22.8	135	13.6	60	40	70
DM-2	3	**339**			092P064	548	36-C	VTUTMSP	620.60	IDF-	40-N	FD	AT	18.7	104	12.8	80	10	30
DM-2	3	**340**			092P013	317	36-C	VTUTCOP	83.30	IDF-	62-C	FD	PY	26.5	225	12.8	60	40	70
DM-2	3	**341**			092P056	274	36-C	VTUTMOP	42.10	SBPS	40-N	PL	AT	20.2	59	19.9	80	10	60
DM-2	3	**342**			092P031	380	36-C	VTUTCOP	18.70	IDF-	62-C	PL		17.5	115	11.4	100	0	50
DM-2	3	**343**			092P095	81	36-C	VTUTMOP	11.20	SBPS	62-C	AT	PL	17.5	99	12.4	60	30	60
DM-2	3	**344**			092P093	567	36-C	VTUTCDE	835.70	SBPS	62-C	PL		22.7	79	19.0	100	0	70
DM-2	3	**345**			092P026	1005	36-C	VTUTCOP	27.30	IDF-	62-C	FD	PL	27.3	115	17.6	60	40	70
DM-2	3	**346**			092P051	49	36-C	VTUTMOP	146.00	IDF-	62-C	PL	FD	6.4	59	6.7	80	10	40
DM-2	3	**347**			092P042	66	36-C	VTUTMOP	253.50	IDF-	62-C	PL		17.2	155	9.3	100	0	40
DM-2	3	**348**			093A007	351	36-C	VTUTMOP	476.70	ESSF	62-C	B	S	24.2	229	9.6	90	10	30
DM-2	3	**349**			092P014	141	36-C	VTUTMOP	40.20	IDF-	62-C	FD	PL	21.9	225	10.6	90	10	40
DM-2	3	**350**			092P027	770	36-C	VTUTCDE	64.00	SBPS	62-C	PL		24.0	115	16.9	100	0	70
DM-2	3	**351**			092P052	754	36-C	VTUTMOP	146.90	IDF-	62-C	PL		16.8	229	7.1	100	0	40

The population used for the sample lists consists of all vegetated treed (VT) polygons for district = 36-C (100 Mile House). It does not exclude the Lignum chart area, or any non-Crown areas.

PPSWR sampling was used to create the lists. Each sample list (**GROUP** field) is representative of the population. More than one sample list can be combined to achieve the desired number of samples. Ideally, each sample list should be completed, however, if only a portion of a list is required to complete the sampling, each list has been randomized and samples can be taken from the top of the list, working down.

In all cases, should a sample be dropped, full documentation as to the reasons why and any actions taken to replace the sample will be required.

Samples that fall outside of the population due to changes in the forest cover (ie logged) should have detailed notes. Plots that are replaced due to inaccessibility or danger should identify the alternate sample location (map/poly). Any question relating to whether or not a sample should be dropped should be addressed to Sam Otukol (387-3592).

The minimum number of NVAF samples required to provide an NVAF estimate for the unit have been identified.

NOTE: These samples locations valid only for the data used for sample selection (ie. must use the same map versions for ground sampling as those used to select samples).

6. APPENDIX C

SCHEDULE A – STANDARDS AGREEMENT

Please see regional VRI coordinator

7. APPENDIX D

DRAFT INVENTORY AUDIT – EXTENDED ANALYSIS

PLEASE CONTACT CARIBOO REGIONAL VRI COORDINATOR

7. APPENDIX E

Population to Sample comparison

75 Identified Samples		
AGECLPRJ	CNT	PERCENT
0	0	0.0
1	0	0.0
2	4	5.3
3	2	2.7
4	11	14.7
5	23	30.7
6	15	20.0
7	9	12.0
8	11	14.7
9	0	0.0
	75	**100.0**
HTCLPRJ	CNT	PERCENT
0	0	0.0
1	6	8.0
2	27	36.0
3	30	40.0
4	12	16.0
5	0	0.0
	75	**100.0**
LD_SPEC	CNT	PERCENT
	0	0.0
AC	0	0.0
AT	4	5.3
B	1	1.3
BL	1	1.3
CW	0	0.0
E	0	0.0
EP	0	0.0

Population	
AREA	PERCENT
10.4	0.0
8,813.0	1.0
35,570.1	4.2
66,543.0	7.8
103,377.0	12.2
155,612.8	18.3
203,934.6	24.0
79,805.8	9.4
178,196.6	21.0
16,186.0	1.9
848,049.3	**100.0**
AREA	PERCENT
10.4	0.0
79,239.4	9.3
296,290.1	34.9
381,863.3	45.0
88,023.5	10.4
2,622.5	0.3
848,049.2	**100.0**
AREA	PERCENT
10.4	0.0
364.6	0.0
47,942.2	5.7
13,686.0	1.6
1,204.8	0.1
2,497.6	0.3
2,383.3	0.3
159.2	0.0

FD	16	21.3	258,439.0	30.5
HW	0	0.0	22.8	0.0
PA	0	0.0	392.6	0.0
PL	43	57.3	440,302.3	51.9
PY	0	0.0	1,080.0	0.1
S	10	13.3	78,558.0	9.3
SB	0	0.0	51.9	0.0
SE	0	0.0	926.7	0.1
SW	0	0.0	27.8	0.0
	75	**100.0**	**848,049.2**	**100.0**

7. APPENDIX F

Additional NVAF Sampling information.

The following information was provided to Nona Phillips by Will Smith of MSRM TIB regarding NVAF sampling. This information is presented to assist proponents in future NVAF planning decisions. It should be noted that the options presented in this summary are presented for consideration by the proponent and do not constitute official MSRM policy regarding the use of NVAF.

The 100 Mile House VRI plan cites that existing information is to be reviewed prior to completing a NVAF sample in the 100 Mile unit. The following table summarises the results of the neighbouring NVAF and other volume and decay samples including the sample trees that have been placed in the TSA with the Lignum NVAF sample. The results are subdivided by the three separate sources of the volume bias:

- 1976 Loss Factors for decay and waste, see the Loss Factor bias worksheet.
- taper equation gross merch volumes, see the taper bias worksheet.
- VRI net factoring, see the net factoring bias worksheet.

Overestimates of volume are indicated by positive percentage bias values.

NVAF Summary Table.

Unit	Group	Taper Bias	SE% (Tpr)	No of trees	Net Factor Bias	Loss Factor Bias
Lillooet TSA	Ac	-13%	9.6	2	-8%	126%
Lignum entire chart area	All	-1%	6.6	45	-1%	2%
Lignum 100 Mile House portion	All	-7%	5.3	16	-1%	0%
Lignum Williams Lk TSA portion	All	2%	7.8	29	0%	3%
Lillooet TSA (incomplete)	All	-7%	10	48	-3%	1%
Williams Lk TSA	All	2%	5.5	51	-1%	15%
Lignum entire chart area	At	7%	8.8	2	18%	70%
Lignum 100 Mile House portion	At	-1%		1	53%	61%
Lignum Williams Lk TSA portion	At	13%		1	0%	75%

Williams Lk TSA	At	8%	4.4	6	-3%	146%
Lillooet TSA	B	1%	6.1	4	0%	13%
Williams Lk TSA	B	10%	0.8	2	-1%	38%
Lillooet TSA	C	5%	1.5	2	-4%	17%
Williams Lk TSA	C	-10%	4.9	3	-11%	56%
Lignum entire chart area	F	2%	7.9	22	-1%	1%
Lignum 100 Mile House portion	F	11%	9.8	3	-9%	-12%
Lignum Williams Lk TSA portion	F	2%	8.3	19	0%	2%
Lillooet TSA (incomplete)	F	-8%	12.4	22	-4%	-1%
Williams Lk TSA	F	-2%	4.9	11	0%	10%
Williams Lk TSA	H	-22%		1	-3%	1%
Chilcotin Pl	Pl	10%	3.1	106	N/A	10%
Lignum entire chart area	Pl	0%	6.6	14	0%	5%
Lignum 100 Mile House portion	Pl	0%	8	9	0%	6%
Lignum Williams Lk TSA portion	Pl	-1%	6.5	5	0%	3%
Lillooet TSA	Pl	-3%	5.3	12	0%	2%
Williams Lk TSA	Pl	16%	14.1	19	-4%	11%
Lignum entire chart area	S	-9%	1.4	7	-1%	1%
Lignum 100 Mile House portion	S	-10%	1.4	3	-1%	1%
Lignum Williams Lk TSA portion	S	-3%	2.8	4	0%	5%
Lillooet TSA	S	-2%	6.9	6	-3%	1%
Williams Lk TSA	S	0%	10.2	9	0%	5%

Summary of Results,

100 Mile House: This is sample shows a small overestimate of net merch volume of 6.5 and 8% for Loss factors and net factoring respectively, where the bias is mostly due to the taper equation. Fd shows a major underestimate of volume and S shows a major overestimate of volume. In spite of the small sample errors,

the results must be treated with caution due to the small sample size.

Major Species: Pl, Fd and S dominate the inventory in the TSA. For the most part, these species are not decadent and should have minimal hidden decay. The Loss Factors are generally making a too large of deduction for decay and waste in the range of 1 to 5%. The taper biases are not as consistent as the loss estimates and vary within and between the species. Slight overestimates of gross merch volume may be occuring in S and minor underestimates may be occuring in Pl.

Minor Species: The minor species of C, B, H, At are all prone to decadence. The Loss Factors are consistently overestimating the amount of decay and waste, conversely, the net factoring is underestimating the amounts of decay and waste. However sample sizes are so small, the results must be treated with extreme caution. Taper does not show a consistent trend.

Some options to consider:

1. Conduct no NVAF sampling and use the 1976 Loss Factors to estimate net volumes. If the 100 Mile House Lignum samples are a good indication of the taper and loss bias, then volumes will be overestimated by around 6.5%.

2. Conduct no NVAF sampling and use the VRI Net factors to estimate net volumes. If the 100 Mile House Lignum samples are a good indication of the taper and loss bias, then volumes will be overestimated by around 8%.

3. Conduct the default NVAF sample of 50 live and 10 dead trees, ensuring that the sample is representative of the population in terms of species and dbh's. Pre-stratify into immature (20 trees) and mature age groups (30 trees: Pl16,Fd9,S3,AtBCH1). This is the preferred option that would address the uncertainty around net merch volume, minimize costs and allow for a confirmation of trends for Pl and Fd.

4. Conduct an enhanced NVAF sample and pre-stratify by major species groups for the mature strata, with one stratum each for immature and dead trees. The sample size would range between 100 and 150 trees.

Timing:

The decision to conduct a NVAF sample can be made at any time without compromising sample costs through extra site visits. The live NVAF sample trees can be selected using existing auxillary plot attributes (dbh species) and the dead trees can be selected through a random process. If selected after sample establishment, the sample trees must be enhanced (and all tree heights measured) at the time of the destructive sampling and this would entail a certified ground sampler to be present with the NVAF sampling crew. Since, most NVAF samplers are also certified for ground sampling, this may not be an extra cost.